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APPLICATION OF PEROVSKITE SOLAR PANELS IN NANOSATELLITE POWER SUPPLY -
THEORETICAL CONSIDERATIONS

Abstract

There has been a rapid development of solar cells, based on hybrid organic-inorganic perovskites in the last 10 years in the field of photovoltaic technologies. These cells are characterized by low weight, high efficiency and resistance to radiation and charged particles. Current research is focused on simulating space conditions on Earth. In addition, OSCAR mission using High-Altitude Pseudo-Satellite (HAPS) and OHSCIS experiment in the MAPHEOS-8 rocket flight have been conducted. The OSCAR mission consisted of a flight lasting over 5 hours and reaching an altitude of about 32 km, where it stayed for 2.7 hours. The mission carried out in the OHSCIS experiment allowed for the research lasting 6 minutes and reaching a height of 239 km.

Due to the lack of research allowing to check the resistance of the cells and parameters change during the long space mission, it is proposed to analyze the possibility of placing several types of cells on the surface of CubeSat to determine the current-voltage characteristics, the temperature of the cell and the influence of cell orientation towards the sun. The data obtained will allow for checking the change of maximum power point and efficiency over time for several types of panels, which will allow to further research of the most promising cells. Due to the possibility of printing the cells on a flexible base layer, the perovskite cells would help create developed, high-performance solar panels allowing to reduce the weight of satellites. The results of the work will be used in the project consisting of building student nanosatellite of CubeSat type.